Reviews

C. Doelter, *Handbuch der Mineralchemie* Band I. (Dresden und Leipzig: Theodor Steinkopff. M. 45.)

The need of a standard work of reference dealing more particularly with the advances made during the last twenty years in our knowledge of mineral statics has been in recent years a very pressing one. The works of Vogt, Tscherwinsky, Doelter, Van Hise, Harker, Elsden, and Clarke have each taken up certain aspects of the subjects, but exhaustive treatment was impossible within the limits imposed. The appearance of the first volume of Doelter's *Handbuch* is, however, sufficient surety that such a work is now to be provided. But it is today no longer possible for one writer to cover the whole field of mineral chemistry, and it has been found desirable in the work under consideration to obtain the services of some 58 contributors, in order especially to insure that the four volumes shall appear within a reasonably short space of time, and consequently at one particular stage in the development of the subject. While the plan leads to a certain amount of overlapping—not in itself necessarily an evil—it has the great advantage that no part of the subject is left untouched, and that every aspect is handled by an authority in that particular field. And in this connection one cannot fail to remark on the fortunate position in which the editor was placed in that he could draw so fully on the resources of the Vienna school.

In two aspects in particular the work represents a marked advance on the older treatises of Rammelsberg and Hintze. The technical application of minerals and mineral materials receives full treatment. Thus in the volume already issued articles appear on the industrial uses of magnesite, on cement, glass, glazes, and enamels. These subjects are discussed in their physicochemical and mineralogical bearing, and the two articles on cement and Zschimmer's exhaustive paper on glass form valuable statements of the results of recent investigations on subjects which are intimately connected with the sciences of mineralogy and petrology. But the dominant line of progress at the present time is the elucidation, largely from the experimental standpoint, of the genesis and stability conditions of minerals that play an important rôle as rock-formers, no matter whether they form from silicate fusion or from aqueous solution. The name of the editor has long been associated with

this line of investigation, and it is from this standpoint in particular that the *Handbuch* will be considered the authoritative work of reference. Consequently it is not merely a treatise on mineral chemistry. It cannot fail to deal as well with the most fundamental problems of petrogenesis.

Some difficulty has been experienced in arriving at an entirely satisfactory arrangement of the material. The older classification of Groth, in which the elements that occur as minerals are first disposed of, has been discarded, and an arrangement has been adopted which is based on, but does not follow in complete detail, the periodic classification of the elements. Thus in the volume now before us carbon and its compounds are first dealt with, and the treatment of silicon and of some of the general aspects of the silicates then follows. Out of some 150 articles it is perhaps invidious to single out any particular cases, as the selection inevitably depends materially on the subjects in which the reviewer is specially interested. Two of the features of the first volume to which the writer has given more careful attention are the articles on the carbonates by Leitmann, and Doelter's paper on silicate melts. Leitmann in a long series of articles has dealt with the naturally occurring anhydrous carbonates, and has handled a literature of enormous proportions with marked judgment and reserve. Particularly valuable are the discussions on synthesis and processes of formation in nature, and the physico-chemical treatment of the solubilities. It is part of the plan of the *Handbuch* to introduce a broad division of the minerals by an article dealing with the whole or part of the field from the comparative standpoint: and Linck's suggestive article on the carbonates of lime, iron, and magnesia summarizes the work of the Jena school on the stability conditions of these compounds as they occur in nature.

Doelter's contributions to this volume deal with the formation of graphite, the carbonates, phosgenite, silicon, the synthesis of the silicates, and silicate fusions. The last is an article of almost 200 pages, which reviews the whole field and emphasizes the lines of investigation at present being pursued. On some points in this paper there will be a decided difference of opinion. While it cannot be doubted that Doelter's insistence on the registration of two temperatures on the fusion curve gives a much-needed emphasis to the fact that silicates react with remarkable slowness, the methods on which he has chiefly relied can hardly be considered to have been so fruitful in the interpretation of two-component systems as the methods of thermal analysis applied by Tammann and his school to the alloys and later to the silicates, or as used

in somewhat different form with such marked success in the Carnegie Institute of Washington. One cannot but feel that Doelter's attitude with reference to some of the work of the American school is unfortunate. Of particular interest, however, are the sections on electrical conductivity, on specific heat and latent heat of fusion, and on the relation of the whole subject to rock crystallization and differentiation. While certain parts of the article are to be found in Doelter's earlier books, it is by far the most complete and valuable résumé of the subject of silicate fusions that we yet possess.

The services of Dittrich have been secured to deal with methods of analysis of the various classes of minerals. Vogt contributes an article on slags, and treats the subject rather more from the standpoint of the metallurgist than in his previous works with which petrologists are acquainted. It need only be added that the publishers seem to have fully realized the value of the *Handbuch*, and have spared no pains to make it a most attractive addition to a reference library. May the other three volumes very soon find their place beside this one on the library shelves.

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An Introduction to the Mathematical Theory of Heat Conduction, with Engineering and Geological Applications. By L. R. INGERSOLL and O. J. ZOBEL. Boston: Ginn & Co., 1913. Pp. 171, 24 figs.

Although primarily intended for students of physics, this textbook contains, as its subtitle would suggest, a certain amount of material that has an important bearing on geological problems, especially those that have to do with the transfer of heat. In chap. vii, on "The Linear Flow of Heat," some of the sections bearing on geology are: thawing of frozen soil, cooling of lava under water, cooling of the earth with and without radioactive considerations, and estimates of age, heat sources, temperatures in decomposing granite. Chap. viii, "The Flow of Heat in More than One Dimension," treats the cooling of a laccolith and the cooling of a sphere by radiation.

The conclusions on the nature and rate of progress of a heat wave traveling from a laccolith into limestone throw interesting light on the conditions of the contact metamorphism of limestone and the development of ores at such points. The slow advance of the heat wave, allowing as it does a difference of temperature of about 50° C. at points 200 meters on either side of the contact, at the end of 10,000 years, must be a